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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,214	09/26/2003	Osamu Shimomura	2018-782	6842

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EXAMINER	
JONES, DIANE ELIZABETH	

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/670,214	SHIMOMURA ET AL.	
	Examiner	Art Unit	
	Diane E. Jones	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☒ Claim(s) *1-10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Alnico reference*.

DETAILED ACTION

Specification

The incorporation of essential material in the specification by reference to an unpublished U.S. application, foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference, if the material is relied upon to overcome any objection, rejection, or other requirement imposed by the Office. The amendment must be accompanied by a statement executed by the applicant, or a practitioner representing the applicant, stating that the material being inserted is the material previously incorporated by reference and that the amendment contains no new matter. 37 CFR 1.57(f).

1. The attempt to incorporate subject matter into this application by reference to Japanese Patent Application No. 2002-285378 is ineffective because foreign applications or patents may not be incorporated by reference. The line "the disclosure of which is incorporated herein by reference" should be deleted.

2. The disclosure is objected to because of the following informalities:

Page 10, Lines 5 states that the rotation angle is "unalterable constantly". It is suggested that the word "fixed" be substituted for "unalterable constantly".

Page 11, Lines 22-23 refer to magnets made of the same material " a rare-earth magnet, a ferrite magnet and an alnico magnet". It is suggested that the word "and" be changed to "or" to clarify this phrase.

Page 15, Line 9, the spacing between the words "of the other machine" is too close. These words should be separated from one another.

Appropriate correction is required.

Claim Objections

3. Claims 1-10 are objected to because of the following informalities: the spacing between words in numerous places is too close. For example, in Claim 3, Line 1, the spacing between the words "according to claim 1" is too close. These words should be separated to clarify their meaning. Appropriate correction is required.

4. Claims 1, 2 and 10 are objected to because of the following informalities:

With respect to Claim 1, Line 2 refers to a "cylindrical magnetic member". Line 4 refers to a "magnetic member". Lines 5-6, 11 and 17 refer to "the magnetic member". It is unclear which magnetic member is the subject of these lines. It is suggested that the phrase "cylindrical magnetic member" in Lines 5, 8-11 and 17 be changed to "cylindrical member" or other distinguishing phrase to clarify its meaning within this claim. Appropriate correction is required.

The claims have been read with the understanding that "the magnetic member" refers to "a magnetic member" as in Line 4 and not to the "cylindrical magnetic member" of Line 2.

With respect to Claims 2 and 10, Claim 2, Line 2 and Claim 10, Lines 2-3 also contain the phrase "cylindrical magnetic member". This phrase should be amended as in Claim 1. Appropriate correction is required.

5. Claim 2 is objected to because of the following informalities:

In Line 2 the phrase "magnetic detective gap" in Lines 7-8 should be changed to "magnetic detection gap". Appropriate correction is required.

In Line 3, the claim refers to two magnet alignment gaps and the main magnet is disposed in each magnet alignment gap. It is not clear how the main magnet can fill two separate gaps. The office suggests that the wording "the main magnet" be replaced with "a main magnet" which would satisfy the requirement "at least one main magnet" of Claim 1, Line 8. Appropriate correction is required.

6. Claim 3 is objected to because of the following informalities:

The wording of Lines 2-7 of Claim 3 is unclear. It is suggested that this claim be reworded to read "the magnetic force applied to the magnetic sensing element by the supportive magnet is not zero when the magnetic force applied to the magnetic sensing element by the main magnet only is zero; and
the magnetic force applied to the magnetic sensing element is zero when the magnetic sensing element and the main magnet".

The above or an equivalent rewording is needed to clarify the meaning of this claim. Appropriate correction is required.

7. Claim 9 is objected to because of the following informalities: In Line 3, the phrase "in its axial direction" is unclear. The axial direction of the end of the magnetic member is not established in the specification. Claim 9 is read with the understanding that the axial direction is that established for the supportive magnet as shown in Fig. 1, Item 8. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Herden et al. (6130535).

With respect to Claim 1, Herden et al. disclose a rotation angle

sensing device (device for determination of a rotary angle, Col. 1, Lines 6-7) comprising:

a cylindrical magnetic member, which is made of a magnetic material and has a substantially cylindrical shape (rotor, Col. 2, Line 10-11 and Fig. 3, Item 11, rotor as shown in Fig. 3 must have depth, therefore it is a cylinder);

a magnetic member (stator, Col. 2, Line10 and Fig. 3, Item 10), which is disposed inside the cylindrical magnetic member (the rotor surrounds the stator, Col. 2, Lines 10-11);

at least one magnetic sensing element, which is fixed to the magnetic member and detects magnetic force (Hall element in stator gap, Col. 2, Lines 16-21 and Fig. 3, Item 16); and

at least one main magnet (first and second ring magnets, Col. 2, Lines 32-35 and Fig. 3, Items 21-22), which is fixed to the cylindrical magnetic member (magnets inserted into the inner wall of the rotor, Col. 2, LInes 32-35) and applies magnetic force to the magnetic sensing element (magnetic flux from ring magnets passes through Hall element, Col. 2, Line 61 to Col. 3, Line 3), wherein a relative rotation angle between the cylindrical magnetic member and the magnetic member is detected on the basis of magnetic force detected in the magnetic sensing element (rotor moves in relation to the stator...angular movement is defined...flux through Hall sensor changes, Col. 3, Lines 14-18),

the rotation angle sensing device further comprising:

a supportive magnet, a rotation angle of which relative to the magnetic

sensing element is constant (additional magnet in the center of the stator slit, Col. 4, Lines 20-22 and Fig. 3, Item 17);

and a magnetic concentration gap, which is formed between the cylindrical magnetic member and the magnetic member, an interval of the magnetic concentration gap becoming smaller in at least one part of the magnetic concentration gap in a predetemined direction (air gap, Col. 2, Lines 61-67 and Col. 3, Item 12, air gap becomes smaller as it passes from the stator slit to the region between the stator plate and the ring magnet, see Fig. 3).

9. With respect to Claim 3, Herden et al. disclose the invention as set forth in Claim 1 and further teach that:

the magnetic force applied to the magnetic sensing element is not vanished by virtue of the supportive magnet when the magnetic force applied to the magnetic sensing element only by the main magnet is vanished (because of the strength of the additional magnet, the linear measuring area A does not have a change in sign, Col. 3, Lines 30-36 and Fig. 4, Area A);

and the magnetic force applied to the magnetic sensing element is vanished when the magnetic sensing element and the main magnet are relatively rotated so that changed strength of the magnetic force applied to the magnetic sensing element corresponds to strength of the magnetic flux applied to the magnetic sensing element by the

supportive magnet (linear measuring area A can be placed into the zero point of the induction B, Col. 3, Lines 36-38).

10. With respect to Claim 4, Herden et al. disclose the invention as set forth in Claim 1 and further teach that the maximum strength of the magnetic force applied to the magnetic sensing element by the main magnet is stronger than strength of the magnetic force applied to the magnetic sensing element by the supportive magnet (in Fig. 4, the strength of the magnetic field at 180° is B_o without the additional magnet, and is $B_o + B_+$ with the supportive magnet. B_+ is clearly smaller than B_o, thus the strength of the additional magnet must be less than that of the ring magnets, especially since the supportive magnet is disposed next to the Hall sensor.)

11. With respect to Claim 5, Herden et al. disclose the invention as set forth in Claim 1 and further teach that the main magnet and the supportive magnet are pemanent magnets having the same temperature characteristic (standard commercial magnets used for ring as well as additional magnets, Col. 2, Lines 42-44 and AlNiCo can be used, Line 55. Alnico cast and sintered magnets have the same maximum temperature, see AlNiCo reference, attached).

12. With respect to Claim 6, Herden et al. disclose the invention as set forth in Claim 1 and further teach that the supportive magnet is disposed closely to the magnetic sensing element (the additional magnet is placed the width of the slit and the Hall element is placed in the center of the slit, Col. 4, Lines 20-22, and is placed close to magnet (see Fig. 3, magnet, Item 17 and sensor, Item 16)).

13. With respect to Claim 7, Herden et al. disclose the invention as set forth in Claim 1 and further teach that the supportive magnet applies magnetic force to the main magnet (lines of magnetic flux of the additional magnet...extend parallel with the magnetic lines of the ring magnet, Col. 3, Lines 2-8).

14. With respect to Claim 8, Herden et al. disclose the invention as set forth in Claim 1 and further teach that the supportive magnet forms magnetic field that is symmetrical with respect to a relative rotation axis between the magnetic sensing element and the main magnet (magnetic bias when rotor is turned is constant, Col. 1, Lines 50-57 and field of the output is increased by the same amount by the additional magnet, Fig. 4, Curve 24).

15. With respect to Claim 9, Herden et al. disclose the invention as set forth in Claim 1 and further teach that the supportive magnet is disposed on an end of the magnetic member (additional magnet extends the width of the stator

slit, Col. 4, Lines 21-22) in its axial direction (field lines of additional magnet are parallel to field lines of the ring magnets, Col. 3, Lines 2-10).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herden et al. in view of Makino et al. (6693424).

With respect to Claim 2, Herden et al. disclose the invention as set forth in Claim 1 and further teach that the magnetic member is divided into at least two portions (the stator has a continuous slit, Col. 4, Lines14-19 and Fig. 3, Item 30) and has a magnetic detective gap formed in a divided part thereof, and the magnetic sensing element is disposed in the magnetic detective gap (Hall element in the center of the slit, Col. 4, Lines 20-21 and Fig. 3, Item 16).

Herden et al. lack the teaching that the cylindrical magnetic member is divided in its diametral direction and includes two magnet alignment gaps formed in divided parts thereof , with a main magnet in each gap, and that the interval of the magnetic concentration gap becomes smaller from each magnet alignment gap toward a central part of each divided portion of the cylindrical magnetic member.

Makino et al. teach a rotation angle sensing device (magnetic rotation angle sensor, Col. 3, Line 18) with a cylindrical magnetic member (yokes in cylindrical shape, Col. 3, Lines 31-34 and Figs. 1-2, Items 1a and 1b) divided in its diametral direction (yokes separated at diametric line, Col. 3, Lines 34-36), and includes two magnet alignment gaps in the divided part (gaps between the ends of the yokes, Col. 3, Lines 37-38 and Fig. 2, Items 3a and 3b) and the main magnet is disposed in each magnet alignment gap (magnets in gaps, Col. 3, Lines 38-40 and Fig. 2, Items 4a and 4b) to prevent short circuiting leakage of the magnetic flux supplied by the magnet (Col. 2, Lines 41-42).

Makino et al. further teach that the interval of the magnetic concentration gap becomes smaller from each magnet alignment gap toward a central part of each divided portion of the cylindrical magnetic member (yoke 1a faces core 2a and magnetic flux decreases as the rotor moves, Col. 4, Lines 49-61 and Fig. 2, Items 1a and 2a) to improve the reliability of the sensor (Col. 4, Lines 65-67).

It would be obvious to one skilled in the art at the time of the invention to modify the rotor of Herden et al.to use the teaching of Makino et al. to include

gaps and insert magnets in these gaps to prevent short circuiting leakage of the magnetic flux provided by the magnets. It would also be obvious to one skilled in the art at the time of the invention to use the teaching of Makino et al. create a varying gap between the cylindrical magnet member and the magnetic member to improve the reliability of the sensor.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. 3891905, 4999531, 6414482 and US Pub 2003/0020468 as disclosing angular position sensors with cylindrical gaps and support magnets.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Diane E. Jones. The examiner can normally be reached on M-F.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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